

Miramar
COMMUNITY GARDEN

GROWING TOMATOES 101 IN SOUTH FLORIDA

Growing Tomatoes 101 is an excerpt from
the Gardening 101 in South Florida manual

To order full manual go to: www.ci.miramar.fl.us/green/garden



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One hundred % of the Manual's proceeds will go to benefit the Miramar Community Garden. Sponsorship opportunities are available, for inquiries please contact Elsi Rose at (954) 602-3270.



Learn How To Grow Your Own Food!

The Miramar Community Garden announces the first edition of “**Gardening 101 in South Florida**”, a manual specially designed to teach everyone how to grow their own food in our challenging sub-tropical climate.

The manual was written by Scott Lewis, who interviewed regional experts and organized the information in this document. Expert growers such as Master Gardeners Michael Madfis, Melissa Contreras, Muriel Oliveras, Pat Simpson, Elaine Farquharson, Beverly Williams, Agustina Wright and Suzanne Smith shared easy-to-follow tips for plentiful yields. The Manual includes key knowledge such as:

- **Core Elements of Gardening:**
 - ◇ Water
 - ◇ Soil
 - ◇ Composting and Fertilizers
 - ◇ Plant selection and Planting Plan
 - ◇ Propagation
 - ◇ Pest Control
 - ◇ Weed Control
 - ◇ Harvesting
 - ◇ Seed Saving
 - ◇ Garden Tools
- **Monthly Calendar Section: A month-by-month description of periodic tasks including:**
 - ◇ Outdoor activities
 - ◇ Indoor activities
 - ◇ Saturday Workday activities

LEGEND



Tidbit from an expert

INTRODUCTION

This “Operating Manual” has been written to assist current and future Miramar Community Garden (MCG) members in their efforts to grow produce and use gardening practices that will be successful in South Florida.

The Manual contains information about what and how to grow in South Florida’s subtropical micro-climate; it can also help maximize production. The Manual has been written for all members, existing and incoming, to follow the instructions and have a good handle on what they would need to do to be successful.

Please note that it is NOT a document that will describe governance and organization topics, although these are critical to the maintenance of the garden.

This document begins by outlining some CORE ELEMENTS that are needed for understanding gardening in South Florida and highlights our approach to growing.

It then presents a CALENDAR including periodic tasks to give garden members some guidance for what plants are right for what times of year and the regular duties that should be performed to maintain the garden.

There is also a section with PRODUCER INTERVIEWS from several successful local sustainable producers describing their growing methods. This is meant to provide some additional insights into ways that various growers approach their work and to support recommendations in the core elements section. The MCG is grateful to expert producers Melissa Contreras, Michael Madfis, Muriel Oliveras and Pat Simpson who contributed their knowledge towards the creation of this manual.

The manual ends with an EMERGENCY SECTION to provide quick access for descriptions of options during emergency situations.

The Manual covers highlights and general topics as guidance; it is not intended to be all-inclusive. It is proposed as a living document which will change with time and input.



DISCLAIMER:

The content of this manual is intended for informational use only. The City of Miramar and the Miramar Community Garden accepts no liability for any damage caused by the utilization of this information.

MCG System

The Miramar Community Garden is located within Fairway Park at 3700 Largo Drive, Miramar, Florida. The 3,150 square foot micro-urban farm is an environmentally and economically sustainable system that creates a network of healthy food sources of naturally grown vegetables and fruits, a social network for garden volunteers to learn about the urban agricultural industry and the opportunity for vocational training.

The Garden's organizational system is communal-based, where members work together to share the harvest.

Website: www.ci.miramar.fl.us/green/garden

Facebook: www.facebook.com/MiramarCommunityGarden1

The Garden's components are:

- 650 planter bags
- Fence (245 linear feet galvanized re-purposed fence from PD building)
- Drip irrigation
- Rain harvesting system
- Composting stations
- Florida wildflower garden border around garden perimeter for attracting pollinators
- Fruit tree (mango)

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South Florida Tomato Growing 101

Nomenclature - Family: *Solanaceae*

Tomato: *Solanum lycopersicum*

Origin - Tomato is a New World vegetable being native to the west coast of South America in the area of Peru and Ecuador. (Source IFAS Extension, 2012-2013, HS739)

Variety Selection Considerations

There are around 7500 tomato varieties grown for various purposes, climates, temperatures, taste, and productivity; it is important to know the basics before choosing the variety to be cultivated.

- **Heirloom tomatoes** tend to produce more interesting and flavorful crops at the cost of possible disease resistance and productivity.
- **Hybrid plants** remain common, since they tend to be heavier producers, and sometimes combine unusual characteristics of heirloom tomatoes with the ruggedness of conventional commercial tomatoes. Hybrids can be affected by high heat unless they are bred to be heat-resistant.
- **Tomato varieties** are based mostly on shape and size. Some of the most popular are:
 - ◇ Beefsteak tomatoes are large tomatoes often used for sandwiches and similar applications.
 - ◇ Plum tomatoes, or paste tomatoes (including pear tomatoes), are bred with a higher solids content for use in tomato sauce and paste, and are usually oblong.
 - ◇ Cherry tomatoes are small and round, often sweet tomatoes generally eaten whole in salads; they tend to be hardy, prolific, and heat resistant to a degree.





D. Elaine Farquharson, expert tomato grower says that there is more to say particularly on the issue of hybrid and heirloom and disease resistance. It is hard to explain as it is drilled into everyone to use disease-resistant hybrids. I am not disputing this but there is more to this issue than first appears. The most common foliage diseases such as bacterial spot and early blight affect hybrids as well as heirlooms. The most common resistance in years past has been to variations of fusarium, verticillium wilt, alternaria, Tobacco Mosaic virus, and nematodes. Unless you have these diseases I would not limit myself to only hybrids that may provide this resistance. Now nematodes certainly are troublesome but I can honestly say I have grown many heirloom and hybrids that aren't resistant to nematodes with much success. They certainly get nematode damage but healthy doses of organic matter and a healthy and robust a plant as can mitigate the problem. Container growing also helps to avoid nematodes.

Breeders have developed plants that provide resistance to other diseases like tomato spot wilt virus and tomato yellow leaf curl virus but again I would not limit myself to these very few varieties unless I was being decimated with these viruses year after year. I did have Tomato spotted wilt virus (vectored by thrips) one year but I never found it necessary to only plant a resistant variety to that particular disease. If your plants are dying year after year, certainly diagnose what disease or cause is the problem and consider a resistant variety if it would help.

I have to say the scourge of my garden is bacterial spot and it knocks down my heirlooms and hybrids as well. I certainly would try any effective resistant variety but again I wouldn't like to limit my choices to a very few selections.

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Tomatoes are also commonly classified as **determinate** or **indeterminate**

- **Determinate**, also called “bush” tomatoes, are varieties that are bred to grow to a compact height (approx. 4 feet). They stop growing when fruit sets on the terminal or top bud, ripen all their crop at or near the same time (usually over a 2 week period), and then die. They may require a limited amount of caging and/or staking for support, should NOT be pruned or “suckered” as it severely reduces the crop, and will perform relatively well in a container (minimum size of 5-6 gallon). Examples are: Rutgers, Roma, Celebrity (called a semi-determinate by some), and Marglobe.
- **Indeterminate** varieties are also called “vining” tomatoes. They will grow and produce fruit until killed by a pest or disease; they can reach heights of up to 10 feet although 6 feet is considered the norm. They will bloom and set new fruit for months and months. They require substantial caging and/or staking for support and pruning and the removal of suckers is practiced by many but is not mandatory. Experiment and see which works best. Examples are: Big Boy, Beef Master, most “cherry” types, Early Girl, and most heirloom varieties.

Timeline

Days to maturity will vary by variety and by environmental conditions. As a general guideline a plant will take about 3-4 months from seed to harvest:

- ◇ **Days from seed to transplant: + 45 (e.g. July 1 – August 15)**
- ◇ **Days to maturity from transplant: 70 – 90 (e.g. August 1- November 1)**

Knowing South Florida’s average temperature will help choose which variety to grow when (see Calendar introduction section). If the transplant date is to be in August which has an average maximum temperature of 89 degrees, the variety chosen should be heat and pest resistant (like everglades tomato).





D. Elaine Farquharson, says that a seed planted in August does not have to be heat resistant as it will be growing in the fall and by the time it is flowering it should be fine. The problem with August is the rain and bugs. Pollen can be denatured when flowers develop during high heat.

Temperature requirements – In general tomatoes will not pollinate at temperatures over 85 degrees, therefore most tomato plants will not set fruit in the hot, humid South Florida summers. Maximum average temperatures from October to May are within the pollinating temperature requirements.



D. Elaine Farquharson, explains that when planting in March or April and running into summer, then it's wise to consider a fast-growing determinate or heat-resistant variety. Tomatoes blossoms are very sensitive to temperature. Temperatures of 55 to 60 will impair pollination, and temperatures from 90 to 95 are also unfavorable. Ideal temps: 70 degrees to 85 in the day and 65 to 70 at night.

Sun Requirements – An established tomato plant will grow well with six to eight hours of sunlight a day; this does not apply to seedlings.

Soil, Compost & Fertilizers

Tomato plants prefer soil that falls between 6.2 and 6.8 on the pH scale, meaning they thrive in soil that is slightly acidic. Tomatoes thrive in nutrient-rich sandy loamy soil. For best results, add organic matter such as compost, grass clippings or leaves to the soil to help your tomatoes retain moisture. Tomatoes don't like soggy soil, so plant them in a well-drained environment that receives plenty of sunlight.

Experts recommend starting with a good quality organic potting mix (not potting soil); the mix should be light and loose, two local brands are Fafard and Lamberts.

Adding acidic organic matter will help counteract the alkalinity of South Florida soil. Oak leaves, coffee grinds and peat moss are examples of acidic choices (peat moss is expensive and not environmentally-sustainable).



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Tomatoes are heavy feeders, so adding nutrition is a must. Amendments of choice vary as do recipes for spaghetti sauce; tomato-growing connoisseurs have their preferences developed from experience. Some of these recommendations are:

- ◇ Plant-based compost
- ◇ Manure – there are several kinds (see Composting & Fertilizing section)
- ◇ Liquid fertilizers such as fish emulsion, seaweed extract and worm compost tea
- ◇ Organic granule fertilizers

Propagation (Sowing Method) - When growing from seed, experts have their own preferences about growing indoors for seedlings or direct sow.

- ◇ **Transplant method:** Growing seedlings in controlled conditions allows for better care of these delicate baby plants. Especially at the Garden when members may not be there every day to supervise if a seedling is in need of water or may be close to a pest that can devour it in a matter of hours. The time period from seed to seedling is critical to the survival of the plant. Seedlings can be placed indoors close to a source of indirect sunlight, or outdoors under shaded conditions. They should be watered daily, by sprinkling lightly or by placing over a tray with water that will be absorbed during the day (not standing water).
- ◇ Some experts recommend feeding the babies diluted fish emulsion once a week to promote strong root systems.
- ◇ **Direct sow method:** is not recommended at the Miramar Community Garden which uses planter bags. For in-ground conditions, variety, weather and temperature will have a direct effect on survival rates. Follow seed packet instructions.





D. Elaine Farquharson: Never start seeds in the ground. Protect them in dappled shade and gradually give them more and more sun. It takes 45 days until they are ready to go into the ground (or an EarthBox). When you are ready to put them out, bury them up to the first true leaves.

Transplanting

- Transplant when seedling is strong enough to handle its new environment. Make sure at least the first true leaves have appeared; these are the ones that follow the cotyledons.
- Make sure soil mixture is prepared as recommended in Soil, Compost & Fertilizers instructions above
- Plant one plant per bag (or two maximum) - keep in mind the spread and height characteristics of the chosen cultivar variety
- Fill soil bag only $\frac{3}{4}$ full – tomato stems root at any place where they are in contact with soil - in order to allow the tomato plant to make as many roots as possible, add a thin layer of soil mix as whenever you see plant growth until the bag is topped off – water after every application to prevent air pockets and keep other soil moist
- Handle seedling with care – never hold plant by stem as it contains its vascular system which may collapse if compressed (equivalent as holding a person by its neck)
- Provide appropriate structural support
- Label variety appropriately to remember care requirements
- Some experts recommend using a collar barrier around seedling to provide pest protection (example cylinder made from 2-little soda container)
- Mulch is a personal choice: bark mulch is not generally good for tomatoes, as it attracts wood eating insects - 5 layers of newspapers makes excellent mulch for growing tomatoes, as do leaves over newspapers – earthbox growing method uses plastic film (in lieu of mulch) to keep soil moist

Tomato Problems - Tomatoes in South Florida are susceptible to many problems, such as late blight, leaf mold bacterial spot, yellowing, curling, leaf miners, white fly, caterpillars, and more. It is

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important to remember that the Miramar Community Garden uses strictly organic pest controls.

- **Prevent** - When growing tomatoes in South Florida, nematodes are a tomato plant's worst enemy. Nematodes hate organic matter, so the more organic matter added, the better the nematode control.
- **Identity and treat**
 - ◇ The University of Florida IFAS department has online advise on how to identify and treat these problems: <http://edis.ifas.ufl.edu/pp121>
 - ◇ Cornell University has a useful site to identify tomato problems: <http://vegetablemdonline.ppath.cornell.edu/DiagnosticKeys/TomWlt/TomWiltKey.html>
- Some common practices are:
 - ◇ BT or Bassilus Thuringiensis can treat creepy crawlers such as the Horn Caterpillar
 - ◇ If soil is too acidic use dolomite (calcium and mg) to bring the acidity level tomatoes like (pH to 6.5)
 - ◇ If soil is too alkaline, sulphur can bring it down but only temporarily, so it is not practical do so so.
 - ◇ When using a bagged mix or a mix with a lot of peat or pine bark which is acidic, it is recommended to add dolomite.
 - ◇ Excessive potassium or magnesium fertilization, can cause bottom-end rot, as these nutrients will compete with calcium for uptake by the plants. Epsom salts is an example of a magnesium source, so do not apply to garden soil unless a recent soil report indicates a magnesium deficiency.
 - ◇ Sunscald occurs when tomatoes are exposed to the direct rays of the sun during hot weather. It is most common on green fruit. Decay causing fungi frequently invade the damaged tissue. To prevent, cover exposed fruits.
 - ◇ Copper Fungicide is used for controlling plant fungus and bacteria on the entire plant (leaves, fruits and flowers).



- ◇ Leaf miners are best eliminated by pinching the leaf and placing in a throwaway bag.
- ◇ Whiteflies can be best treated early on, at first appearance of the insect, by spraying underside of leaf with an insecticidal soap mixture. A horticultural oil can also be used with the caution that it cannot be sprayed when too hot or sunny as it will char the leaves. Oil cannot be used when using sulphur as they are antagonistic to one another.
- ◇ Attracting and protecting beneficial insects to handle the harmful ones.
- ◇ More information about the tomato plant's physiological, nutritional, and other disorders can be found at: <http://edis.ifas.ufl.edu/hs200>



D. Elaine Farquharson, recommends that when caterpillars are found, it is best to remove them by hand before reaching for the BT.



D. Elaine Farquharson: If you get flowers but no fruit, try tapping the flowers to pollinate. Tomatoes are self-pollinating, rather than by insect, but they need movement or wind to circulate the pollen.

Companion Plants & Pest Control - Tomatoes are compatible with a large variety of companion plants. One of the most popular pairings is tomato and carrots.

- The devastating tomato hornworm has a major predator in various parasitic wasps, whose larvae devour the hornworm. Parasitic wasps drink nectar from tiny-flowered plants like parsley and dill.
- Other plants with strong scents, like alliums (onions, chives, garlic) and mints (basil, oregano, spearmint) are simply thought to mask the scent of the tomato plant, making it harder for pests to locate it, or to provide an alternative landing point, reducing the odds of the pests from attacking the correct plant.
- Ground cover plants, including mints, also stabilize moisture loss around tomato plants and other solaneae, which come from very humid climates, and therefore may prevent moisture-related problems like blossom end rot.

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D. Elaine Farquharson, as far as the companion planting -- I can see the point of planting a plant to attract beneficials, but I am skeptical of much of its basic premises. I do not believe that growing onions or mint effect a tomato's flavor. And mint has the most invasive, dense roots.; not sure I want it competing for available nutrients. Also some plants are magnets for spider mites and I don't want to draw them near my tomato plants.

To prune or not to prune?

Determinate varieties should NOT be pruned. This will maximize fruit yield from these shorter plants. Indeterminate varieties vary in their response to pruning, some reportedly have increased yields when the young plant is pruned back to three or four vines.

Pruning is actually not necessary; however, if you want taller plants or larger fruits you may need to prune excess vines that start to form where the leaf meets the main stem. Different tomato cultivars vary in their response to sucker removal. For some, light pruning (removing the first four suckers) results in the greatest yield; for others, no pruning gives the highest yield. Experiment with your favorite variety. Some recommend letting the plant produce stems for better fruit production and better leaf canopy to protect the fruit from sunscald. Some gardeners recommend removing the first 3 stems from the bottom of the plant to invite greater air flow at the base of the plants and reduce the risk of fruit touching the ground where they insects and disease might be encouraged. Some recommend letting the plant produce stems for better fruit production and better leaf canopy to protect the fruit from sunscald.



D. Elaine Farquharson, as far as pruning -- There was a study that showed pruned plants produced bigger but fewer tomatoes. Unpruned plants produced smaller but more tomatoes. The actual weight of tomatoes was apparently comparable. Pruning the bottom leaves to get them off the ground and increase air flow can certainly be recommended. But as mentioned above, be wary of sun scald. Also the plant's sugars produced in the leaves are what makes a tomato taste good. Sometimes, tomatoes are planted too close, which causes lack of air flow. Green house tomatoes are heavily pruned and the yield is



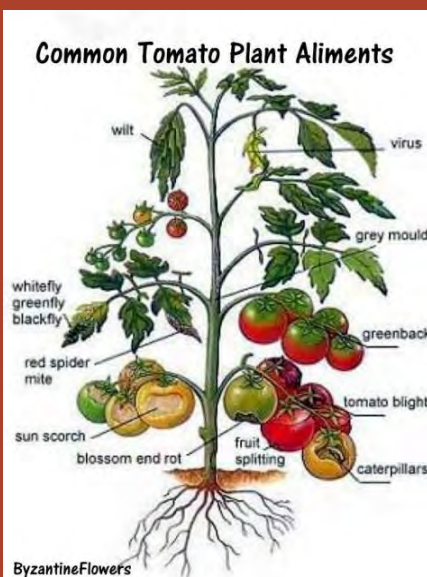
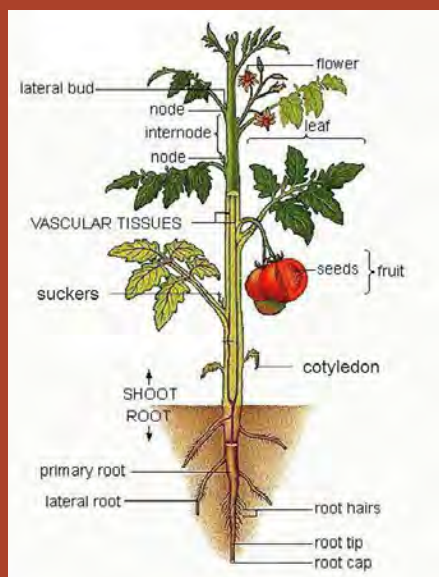
fantastic but the tomatoes are extremely exposed but don't suffer from sunscald as it is protected.

Harvesting – it is helpful to know the varieties expected lifespan. An indeterminate variety can grow for months and months with great production. It does not need to be removed until it is overcome by diseases.

A determinate variety will most likely not do well after the plant has reached maturity and will most likely lead to declined production. When using determinates, planting seeds every 3-4 weeks can lead to maximized production during the entire growing season in South Florida.



D. Elaine Farquharson: Manage your garden; don't plant everything at the same time to make your harvest last.



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Sponsorship opportunities are available, for inquiries please contact Elsi Rose at (954) 602-3270.